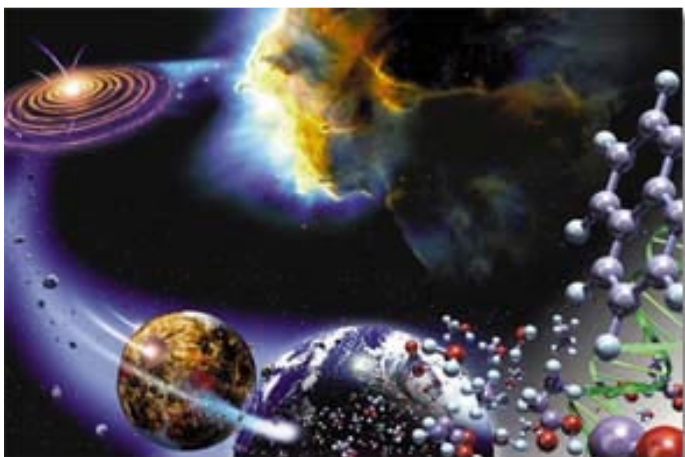




Atoms, Elements and Molecules Reading



You have had a chance to explore **atoms** (the building blocks that make up all **matter**) and **molecules** (composed of several atoms). Your building materials were like atoms, and your constructions were like molecules. Each building material had different **properties** from other building materials.

Similarly, building materials used to create buildings, containers, jewelry or other tools have different properties. For example, **metals** are often used as a building material and may include aluminum, copper, silver and gold. Each of these metals varies in color, strength and other properties. These metals are sometimes combined with each other to form a substance with a new property. For example, pure gold is a very soft metal that is often combined with silver, copper and zinc to form a stronger metal that will not change its form as easily. The atoms that compose a substance determine its properties.

When a substance is pure and is composed of one kind of atom, it is called an **element**. There are more than one hundred different elements, but most of the substances in the universe are made with twenty or so of the most common ones.

Each element has its own unique properties, and every atom of that element will have those same properties. These properties include: size, mass, **melting point**, **boiling point**, and color.

The way in which an atom of an element **bonds** with other atoms is also a property. Each element bonds with other atoms in a characteristic way. When atoms are bonded together, they form molecules. Molecules can be as simple as two oxygen atoms bonded together, or they can be highly complex chains involving hundreds of atoms of many different elements.

For example, the element carbon has four available spots to bond with other atoms, while the element oxygen has two. One carbon atom and two oxygen atoms can combine to form a molecule of carbon dioxide. Each of the oxygen atoms bonds with two of the carbon atom's open spots. In truth, there are factors that can drastically change how atoms bond together, but the changes follow rules that are predictable.

Atoms and elements are the building blocks of molecules, and molecules are the building blocks of matter. Different combinations of atoms (building blocks) can create very different substances. Carbon dioxide (CO_2) and methane (CH_4) both have carbon in them, but the gases have different properties from one another, and the properties of those gases are different from the properties of pure carbon, oxygen, or hydrogen.

The properties of carbon dioxide, water vapor, nitrogen gas, oxygen gas, and ozone make them essential to support life on Earth. In many cases, the amount of the gas in the atmosphere is also important. As you continue in the Atmosphere Training Module, you will understand why these gases are needed in certain amounts.

